IN THE CLAIMS

1. (amended) A liquid composition for the control of pitch deposition in pulp and paper making comprising in aqueous solution:

(a) a derivatized cationic guar polymer having a charge density of the derivatized cationic guar polymer is from 0.01 meq/g. to 3.0 meq/g., and

(b) an isobutylene/maleic anhydride copolymer having an average molecular weight of from 5,000 to 100,000.

such that the weight ratio of cationic guar to isobutylene/maleic anhydride copolymer is from 6:1 to 1:6.

THE INVENTION

Claims 1-5, related to a pitch control composition, and claims 6-10, related to a process for controlling pitch, are pending. The process works by detackifying the pitch so it can be dispersed in the process water and moves along in the process stream without attaching to the paper making equipment.

Applicant requests that the Examiner consider each group of claims separately because the process claims are further distinguished from the prior art. The process claims are further distinguished from the prior art because the derivatized cationic guar and isobutylene/maleic anhydride copolymer are added to the process water as a blend rather than sequentially. Furthermore, the prior art does not disclose the use of the blend of derivatized cationic guar and isobutylene/maleic anhydride copolymer in a process for detackifying pitch.

Experiments shown in the application indicate that the pitch deposition on paper making equipment is decreased by using the blend invented by Applicant. Not only is pitch deposition controlled by using the subject compositions, but the ionic balance of the paper making system is not disturbed, thus limiting detrimental interactions with other process additives. Additionally, the pitch control does not generate foam and can be used without creating stress to the environment.

Applicant also wants to mention the change at page 6 of the specification, Table I, Comparison E, where "isobutylene/cationic guar" was deleted and "sodium salt of isobutylene maleic anhydride" was inserted. It is obvious from the description that this example is a comparison example, and, as such, would not have contained both isobutylene maleic anhydride and cationic guar.

DISCUSSION OF THE EXAMINER'S OFFICE ACTION

I. REJECTION UNDER 35 U.S.C. §112

The Examiner rejected claims 1-10 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. He says that only derivatized cationic guar having a cationic charge of between 0.01 meq./g and 3.0 meq/g and a weight ratio of derivatized cationic guar to isobutylene/ maleic acid anhydride copolymer of 6:1 to 1:6 are enabled. The claims are amended to overcome to this rejection.

The Examiner also objected to the specification under 37 C.F.R. §1.71 because it is non-enabling as to amounts or proportions of maleic acid anhydride and isobutylene present in the copolymer. The isobutylene/maleic acid anhydride copolymer Applicants used in the examples was TAMOL 731 supplied by Rohm & Haas. The ratio of isobutylene to maleic acid anhydride in this copolymer is unknown to Applicant and not available to the public. Applicant submits that these amounts are not critical and the prior art cited by the Examiner shows wide ranges for these amounts. For instance, JP 55-84491 shows a mole ratio of the isobutylene and maleic acid of 1:9 to 9:1. Certainly, one skilled in the art can practice Applicants invention without undue experimentation, particularly in view of the examples, and Applicant furnished the best mode with respect to this component of the composition.

II. REJECTION UNDER 35 U.S.C. §103

The Examiners rejected under 3 5 U. S. C. §103 (a) as being unpatentable over Farley (3,992,249) or JP 55-84491 in view of Svending (4,946,557) or Larsson (4,755,259) and Louche et al. The Examiner supports his rejection as follows:

> Farley and JP 55-84491 disclose the use of the claimed isobutylene and maleic acid copolymer as a pitch control agent in paper making. JP 55-84491 teaches that the copolymer acts to disperse the pitch particles. Louche teaches that it is a well known concept of using anionic polymers to disperse pitch particles and cationic polymer to fix the pitch particles, i.e., retain the pitch particles. Svending or Larsson show that cationic guar gum is a well known cationic polymer retention aid.

It is true that Farley (3,992,249) and JP 55-84491 disclose the use of isobutylene maleic acid or anhydride copolymer for pitch control. However, Applicant claims a blend comprising isobutylene/maleic anhydride copolymer and a derivatized cationic guar. The data in Table II (page 7) of Applicant's specification show that the blend is more effective as a pitch control agent than either derivatized cationic guar or isobutylene/maleic anhydride copolymer when used alone. Neither Farley or JP 55-84491 disclose a blend of derivatized cationic guar and isobutylene/ maleic anhydride copolymer, nor do they suggest the advantages of using such a blend to decrease the formation of pitch.

The Examiner evidently agrees since he found it necessary to combine the primary references with one or more secondary references. Svending (4,946,557), Larsson (4,755,259), and Louche were cited as the secondary references.

Louche relates to the addition of cationic polyelectrolyte polymers (coined as "ionenes") to enhance the performance of high molecular weight anionic polymers, such as polyacrylamides and poyethylene-imines, as retention aids and drainage aids in paper making processes. "Ionenes" are described as cationic charged condensation polymers in which a positively charged group is built into the polymer chain.

Applicant's consider the teachings of Louche to be vague. Applicant's are not sure what an "ionene" is. The only example they see which names a specific "ionene" is Case 1 at page 8 where "cationic starch" is mentioned. Applicant has no way to determine whether derivatized cationic guar is an "ionene". In view of the vagueness of the teachings of Louche, Applicant submits that combining Louche with the primary references does not teach Applicant's blend or suggest the improvement in pitch control when the blend of derivatized cationic guar or isobutylene/maleic anhydride copolymer is used as the pitch dispersant.

Furthermore, cationic starch is different than cationic guar. Cationic starch is a straight chain molecule of repeating anhydroglucose units through the 1,4 glucosidic linkage. Each anhydroglucose unit contains three hydroxyl groups. By substituting carboxylmethyl groups onto some of the hydrogen atoms as these hydroxyl groups, sodium carboxymethylcellulose (CMC) is obtained. CMC is reacted with ethylene oxide to form hydroxylethycellulose (HEC).

On the other hand, cationic guar gum is a straight chain of D-mannose with a D-galactose side chain on approximately every other mannose unit where the ratio of mannose to galactose is 2:1. Guar gum is reacted with propylene oxide to form hydrooxypropyl guar. Hydroxypropyl guar is further reacted with trimethyl-ammonium chloride to form cationic hydroxypropyl-trimonium chloride guar, known commercially as N-Hance 3000.

There are clear differences between cationic guar and cationic starch:

1. The backbone chains are different as described.

2. The functionality of the cationic group is different. The cationic guar is based on "hydroxypropyl" while the cationic starch is based on "hdyroxylethyl" groups.

3. The quaternizing agent for cationic guar is trimethylammonium chloride while the quaternizing agent for the cationic starch is N,N diallyl N,N dimethylammonium chloride.

4. The cationic guar has a low charge density, e.g. 0.01 meq/gm to 0.15 meq/g.

In view of these differences between derivatized cationic guar and cationic starch, Applicant submits that Louche's disclosure of cationic starch does not suggest derivatized cationic guar. There is nothing in Louche which suggests they are equivalents.

Furthermore, the approach towards pitch control in Louche is different than the one taken by Applicant. Louche is more concerned with the "fixation" of the pitch on fibers. Louche does not discuss "detackification" which involves keeping the pitch dispersed so it will not attach to paper making equipment. In contrast to the fixation process described by Louche, Applicant's process is a "detackification" process.

Fixation occurs according to Louche because Louche uses the anionic polymer and cationic starch in sequence, first the anionic polymer and then the cationic starch. In Applicant's process, the pitch is detackified instead of fixed. This occurs because Applicant uses a blend of anionic isobutylene/maleic anhydride copolymer and derivatized cationic guar which are added together to the processing water. The blend detackifies the pitch by converting hydrophobic pitch to hydrophilic pitch. The hydrophilic pitch can be dispersed in the pulp without attaching to the pulp or paper making equipment. In view of this, Applicants' composition and process are not taught of suggested by combining Louche with Farley and JP 55-84491.

Applicant also asks the Examiner to note that there apparently is no publication date on Louche. Therefore, there is some question about whether Louche is prior art.

Svending and Larsson, the other secondary references, disclose the use of a cationic polymer, including cationic guar, with colloidal silicic acid to improve retention of fines and fillers. Svending and Larsson do not teach or suggest using cationic guar for pitch control, and they do not suggest their use with isobutylene/maleic anhydride copolymers.

III. CONCLUSION

Applicants submit that the combination of references cited by the Examiner do not teach or suggest Applicant's pitch control composition (claims 1-5) or process for controlling pitch (claims 6-10), particularly in view of the improvement obtained by using Applicant's blend to control pitch.

The combination of references do not disclose a blend of isobutylene/maleic anhydride copolymer and derivatized cationic guar or the advantages which result from using it. The process claims are further distinguished from the prior art because the derivatized cationic guar and isobutylene/maleic anhydride copolymer are added to the process water as a blend rather than sequentially to detackify the pitch.

Applicants submit that the application is now in condition for allowance and respectfully request a notice to this effect. If the Examiner believes further explanation of Applicants' position is needed, Applicants' attorney will discuss this matter over the telephone or visit the Examiner personally if this may be useful.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this Amendment Under 37 C.F.R. § 1.111 is being deposited with the United States Postal Service on April 2, 1998 with sufficient postage as first class mail in an envelope addressed to the Assistant Commissioner of Patents, Washington, D.C. 20231.

Jewell Beaudry

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